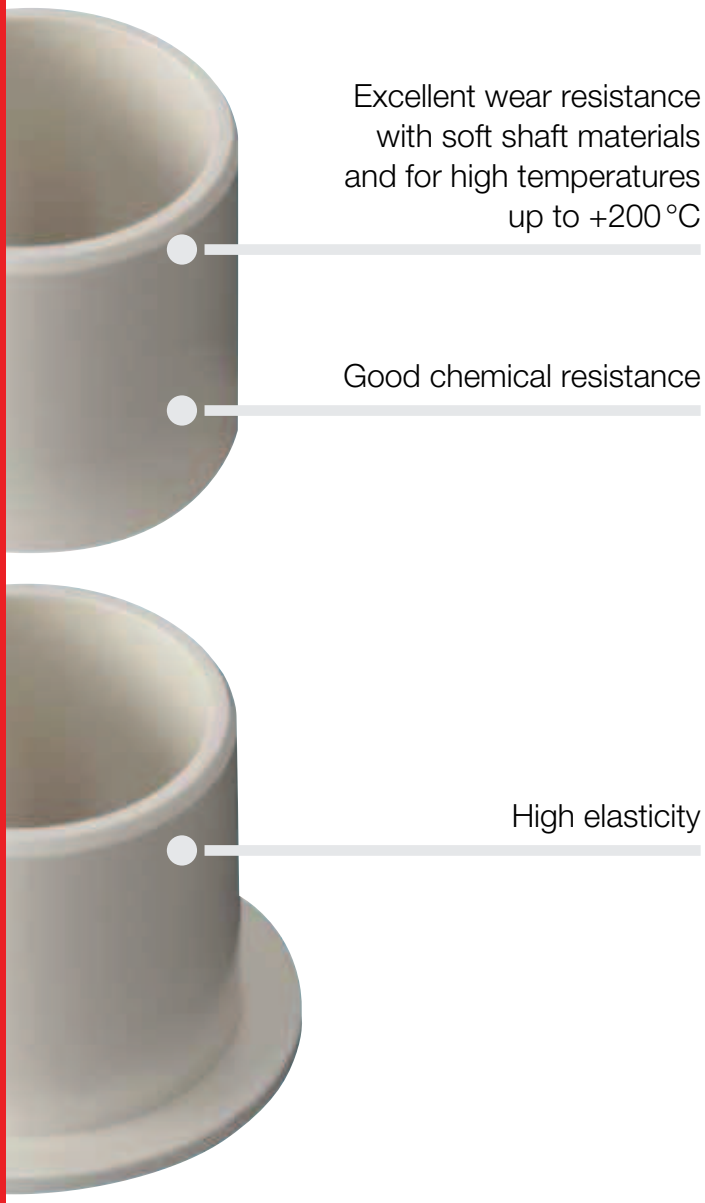
iglidur® V400

High chemical- and temperature resistance. Highly wear-resistant bearing for soft shafts and temperatures up to +200 °C with low moisture absorption and excellent resistance to chemicals.



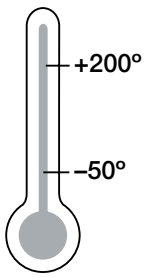
When to use it?

- When extreme wear resistance is required with soft shafts
- For applications at temperatures higher than +100 °C
- When vibrations and edge pressure are present
- When the bearing should be resistant to chemicals

When not to use it?

- For hardened shafts
  ▶ **iglidur® W300, page 131**
- For applications at normal temperatures
  ▶ **iglidur® G, page 61**
  ▶ **iglidur® J, page 89**
  ▶ **iglidur® W300, page 131**
- When a cost-effective universal bearing is required
  ▶ **iglidur® G, page 61**

Temperature



Product range

2 types
Ø 6–20 mm
more dimensions
on request

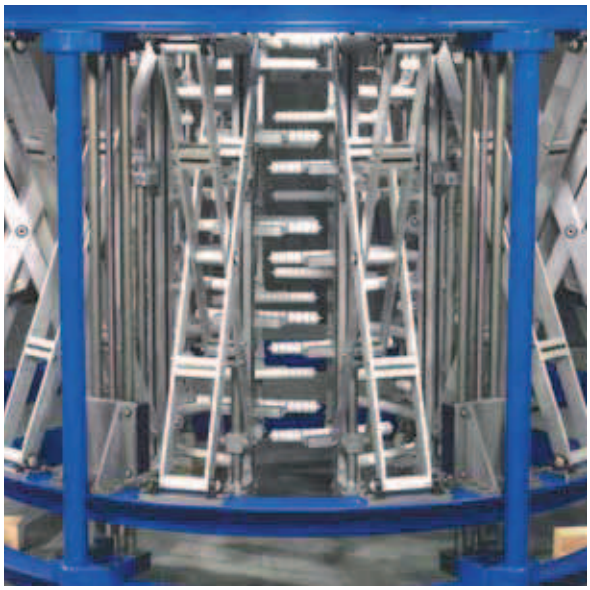
iglidur® V400 | Application Examples

Typical sectors of industry and application areas

● Plant construction ● Automotive
● Automation ● Aerospace engineering
● Mechatronics etc.

Improve technology and reduce costs – 310 exciting examples for iglidur® plain bearings online

▶ www.igus.eu/eu/iglidur-applications



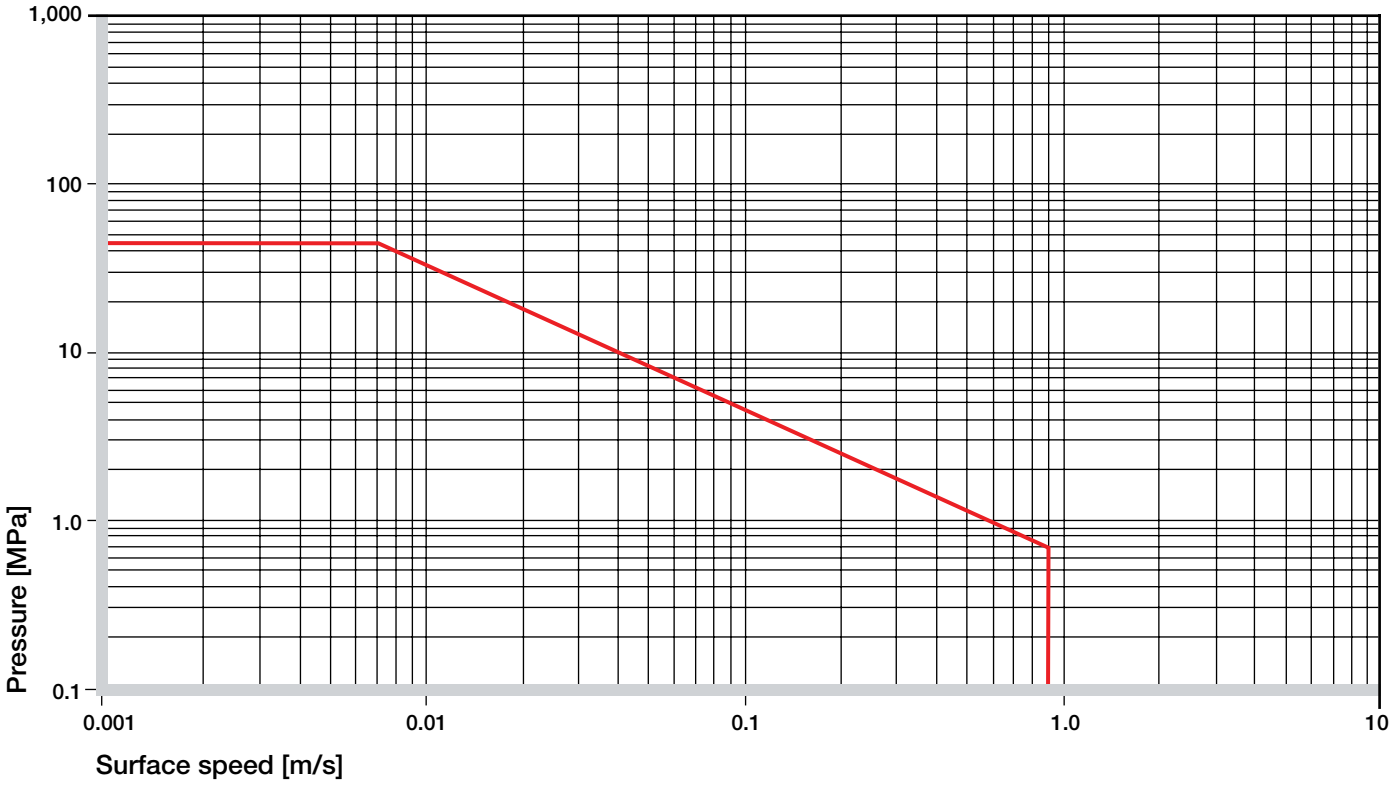
▶ www.igus.eu/blown-film-line

iglidur® V400 | Technical Data

Material data			
General properties	**Unit**	**iglidur® V400**	**Testing method**
Density	**g/cm³**	1.51	
Colour		white	
Max. moisture absorption at +23 °C/50 % r.h.	**% weight**	0.1	DIN 53495
Max. moisture absorption	**% weight**	0.2	
Coefficient of sliding friction, dynamic against steel	**µ**	0.15–0.20	
pv value, max. (dry)	**MPa · m/s**	0.50	
Mechanical properties			
Modulus of elasticity	**MPa**	4,500	DIN 53457
Tensile strength at +20 °C	**MPa**	95	DIN 53452
Compressive strength	**MPa**	47	
Max. recommended surface pressure (+20 °C)	**MPa**	45	
Shore D hardness		74	DIN 53505
Physical and thermal properties			
Max. long term application temperature	**°C**	+200	
Max. short term application temperature	**°C**	+240	
Max. ambient temperature, short term[1)]	**°C**	+250	
Min. application temperature	**°C**	–50	
Thermal conductivity	**W/m · K**	0.24	ASTM C 177
Coefficient of thermal expansion (at +23 °C)	**$K^{-1} \cdot 10^{-5}$**	3	DIN 53752
Electrical properties			
Specific volume resistance	**Ωcm**	$> 10^{12}$	DIN IEC 93
Surface resistance	**Ω**	$> 10^{12}$	DIN 53482

[1)] Without additional load; no sliding movement; relaxation possible

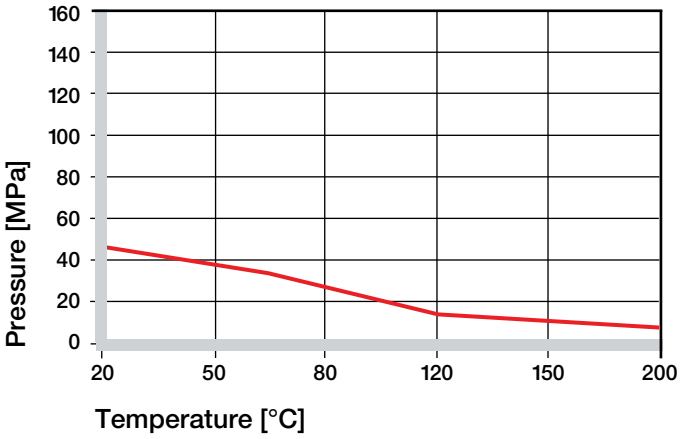
Table 01: Material data



Graph 01: Permissible pv values for iglidur® V400 with a wall thickness of 1 mm dry running against a steel shaft at +20 °C, mounted in a steel housing

Mechanical Properties

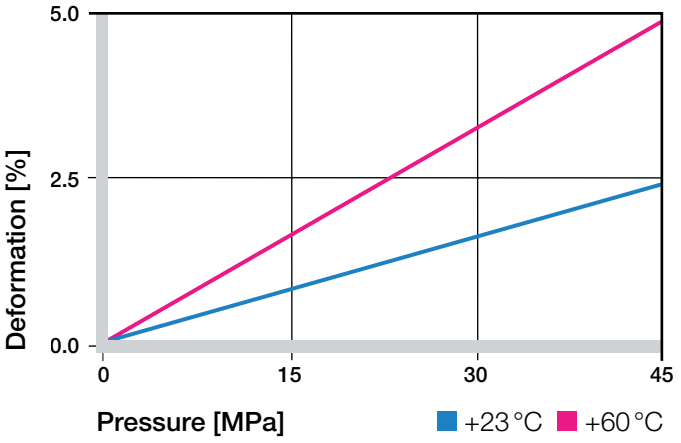
The recommended maximum surface pressure is a mechanical material parameter. No conclusions regarding the tribological properties can be drawn from this. With increasing temperatures, the compressive strength of iglidur® V400 plain bearings decreases. The Graph 02 shows this inverserelationship. However, at the longterm maximum temperature of +200 °C the permissible surface pressure is almost 10 MPa.



Graph 02: Recommended maximum surface pressure as a function of temperature (40 MPa at +20 °C)

iglidur® V400 bearings are not suitable for high pressures or static high loads. However they are characterized by a high wear resistance all the way up to the maximum recommended surface pressure. Moreover the limit of the permitted loads at +100 °C is still higher with 20 MPa. The high elasticity is seen also in Graph 03.

▶ Surface Pressure, **page 43**



Graph 03: Deformation under pressure and temperature

Permissible Surface Speeds

iglidur® V400 also permits high surface speeds due to the high temperature resistance. The very favorable coefficients of the bearing enable maximum surface speeds up to 1.3 m/s. Even higher are the permitted speeds for linear movement and 3 m/s can be attained on the short term.

▶ Surface Speed, **page 45**

m/s	Rotating	Oscillating	Linear
Continuous	0.9	0.6	2
Short term	1.3	0.9	3

Table 02: Maximum running speed

Temperatures

The long-term maximum permissible application temperature is +200 °C, although at these temperatures the bearings have to be mechanically secured. Then, however, the wear resistance of the bearings is very good and adopts a leading position among all iglidur® materials. The compressive strength of iglidur® V400 plain bearings decreases with increasing temperatures. Graph 02 clarifies this connection.

▶ Application Temperatures, **page 46**

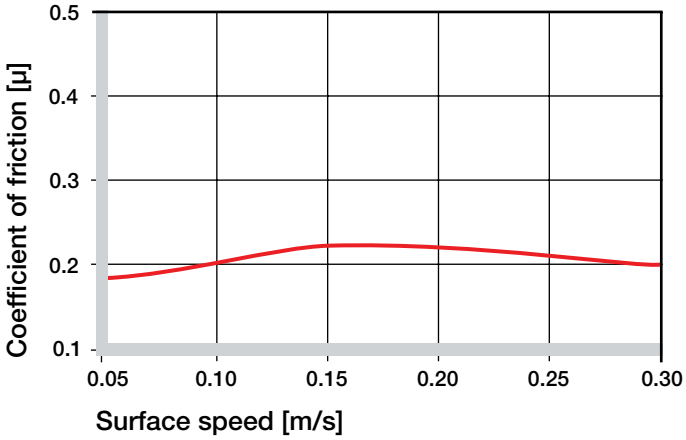
iglidur® V400	Application temperature
Minimum	–50 °C
Max. long term	+200 °C
Max. short term	+240 °C
Add. securing is required from	+100 °C

Table 03: Temperature limits

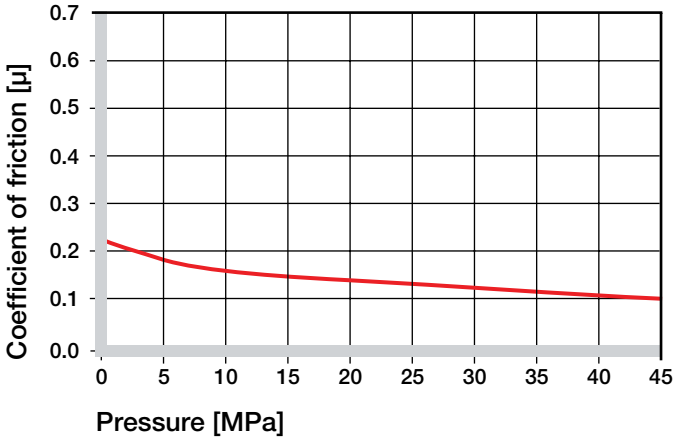
Friction and Wear

The coefficient of friction is dependent on the bearing's stressing capacity. When pv values exceed the permitted range, the bearings respond with a rise in coefficient of friction. As long as the loads are in the permitted range, the coefficient of friction of the bearing is very low. Furthermore, the coefficients of friction of iglidur® V400 are very constant. No other iglidur® bearing material exhibits a lower variance in the coefficients of friction, even when the shaft material is altered.

▶ Coefficients of Friction and Surfaces, **page 48**
▶ Wear Resistance, **page 49**



Graph 04: Coefficient of friction as a function of the running speed, p = 0.75 MPa

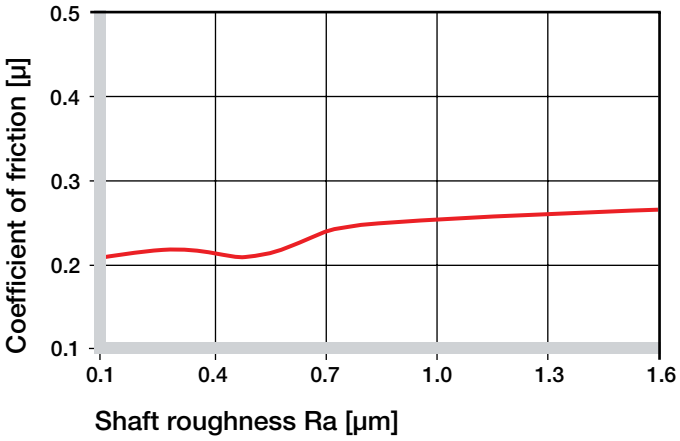


Graph 05: Coefficient of friction as a function of the pressure, v = 0.01 m/s

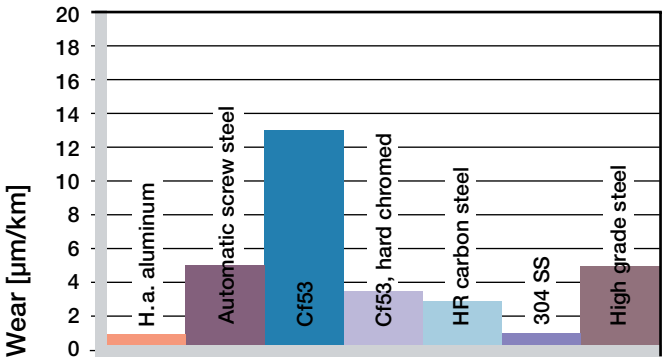
Shaft Materials

Greater is the influence on wear resistance. Here already at low loads (0.75 MPa) there could be significant variations, as Graph 07 shows.
iglidur® V400 is a material which clearly shows better wear performance in rotating than in oscillating applications.

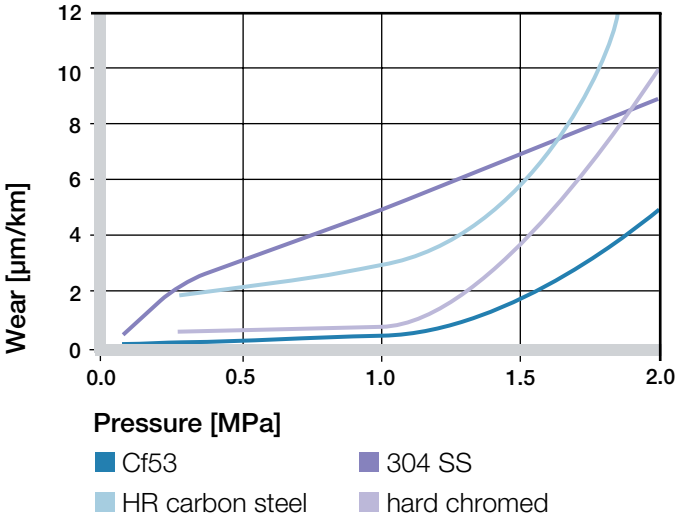
▶ Shaft Materials, **page 51**



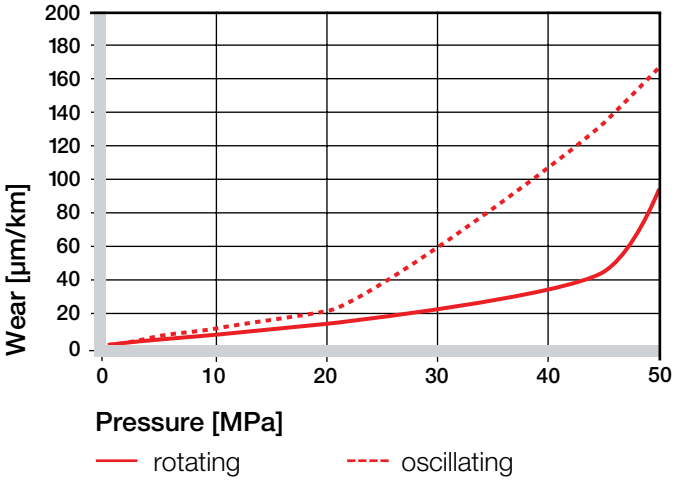
Graph 06: Coefficient of friction as function of the shaft surface (Cf53 hardened and ground steel)



Graph 07: Wear, rotating with different shaft materials, pressure p = 0.75 MPa, v = 0.5 m/s



Graph 08: Wear with different shaft materials in rotational operation, as a function of the pressure



Graph 09: Wear for oscillating and rotating applications with shaft material Cf53 hardened and ground steel, as a function of the pressure

iglidur® V400	Dry	Greases	Oil	Water
C. o. f. µ	0.15–0.20	0.09	0.04	0.04

Table 04: Coefficient of friction against steel (Ra = 1 µm, 50 HRC)

Additional Properties

Chemical Resistance

iglidur® V400 plain bearings feature good chemical resistance. They are resistant to detergents, greases, oils, alcohol, solvents, diluted bases, as well as to diluted acids.

▶ Chemical Table, **page 974**

Medium	Resistance
Alcohol	+
Hydrocarbons	+
Greases, oils without additives	+
Fuels	+
Diluted acids	+
Strong acids	+
Diluted alkalines	+
Strong alkalines	–

+ resistant 0 conditionally resistant – not resistant
All data given at room temperature [+20 °C]
Table 05: Chemical resistance

Radiation Resistance

Plain bearings of iglidur® V400 are resistant to a radiation intensity of $2 \cdot 10^4$ Gy. Higher radiation affects the material and can result in a loss of important mechanical characteristics.

UV Resistance

iglidur® V400 plain bearings are resistant to UV radiation to a large extent.

Vakuum

In the vacuum, iglidur® V400 plain bearings can only be used to a limited extent. Outgassing takes place.

Electrical Properties

iglidur® V400 plain bearings are electrically insulating.

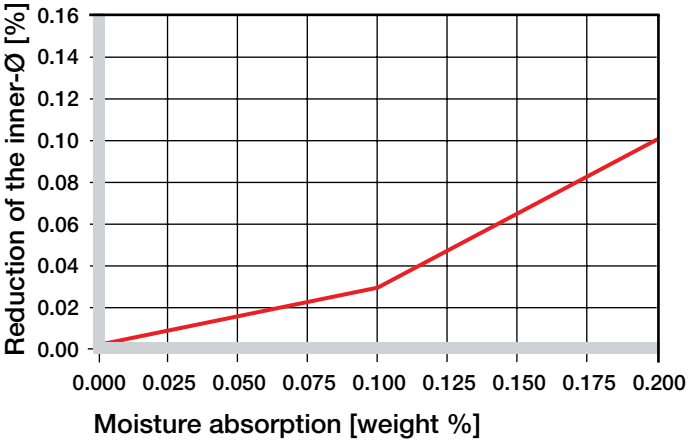
Volume resistance	$> 10^{12}$ Ωcm
Surface resistance	$> 10^{12}$ Ω 10

Moisture Absorption

The moisture absorption of iglidur® V400 plain bearings is only 0.2 % after saturation in water.

Maximum moisture absorption	
At +23 °C/50 % r.h.	0.1 % weight
Max. moisture absorption	0.2 % weight

Table 06: Moisture absorption



Graph 10: Effect of moisture absorption on plain bearings

Installation Tolerances

iglidur® V400 plain bearings are standard bearings for shafts with h tolerance (h9 recommended at least).
The bearings are designed for pressfit into a housing with a H7 tolerance. After being assembled into a nominal size housing, the inner diameter of the bearings is automatically adjusted to F10 tolerance.

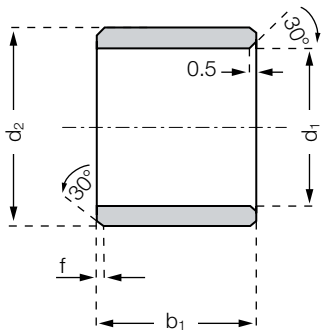
▶ Testing Methods, **page 55**

Diameter d1 [mm]			Shaft h9 [mm]	iglidur® H F10 [mm]	Housing H7 [mm]
	up to	3	0–0.025	+0.006 +0.046	0 +0.010
> 3	to	6	0–0.030	+0.010 +0.058	0 +0.012
> 6	to	10	0–0.036	+0.013 +0.071	0 +0.015
> 10	to	18	0–0.043	+0.016 +0.086	0 +0.018
> 18	to	30	0–0.052	+0.020 +0.104	0 +0.021
> 30	to	50	0–0.062	+0.025 +0.125	0 +0.025
> 50	to	80	0–0.074	+0.030 +0.150	0 +0.030

Table 07: Important tolerances for plain bearings according to ISO 3547-1 after pressfit

iglidur® V400 | Product Range

Sleeve bearing



Order key

VSM-0608-06

- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form S)
- Material iglidur® V400

Dimensions according to ISO 3547-1 and special dimensions

Chamfer in relation to the d1

d1 [mm]:	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]:	0.3	0.5	0.8	1.2

Dimensions [mm]

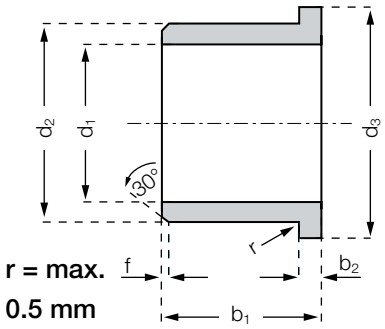
Part number	d1	d1-Tolerance*	d2	b1 h13
VSM-0608-06	6.0	+0.010 +0.058	8.0	6.0
VSM-0810-10	8.0	+0.013 +0.071	10.0	10.0
VSM-1012-10	10.0	+0.013 +0.071	12.0	10.0
VSM-1214-12	12.0	+0.016 +0.086	14.0	12.0
VSM-1618-15	16.0	+0.016 +0.086	18.0	15.0
VSM-2023-20	20.0	+0.020 +0.104	23.0	20.0

* after pressfit. Testing methods ▶ page 55

delivery time available from stock | prices price list online www.igus.eu/eu/v400 | order example part number VSM-0608-06

iglidur® V400 | Product Range

Flange bearing



r = max. 0.5 mm

Order key

VFM-0608-06

- Length b1
- Outer diameter d2
- Inner diameter d1
- Metric
- Type (Form F)
- Material iglidur® V400

Dimensions according to ISO 3547-1 and special dimensions

Chamfer in relation to the d1

d1 [mm]:	Ø 1–6	Ø 6–12	Ø 12–30	Ø > 30
f [mm]:	0.3	0.5	0.8	1.2

Dimensions [mm]

Part number	d1	d1-Tolerance*	d2	d3	b1	b2
				d13	h13	–0.14
VFM-0608-06	6.0	+0.010 +0.058	8.0	12.0	6.0	1.0
VFM-0810-10	8.0	+0.013 +0.071	10.0	15.0	10.0	1.0
VFM-1012-10	10.0	+0.013 +0.071	12.0	18.0	10.0	1.0
VFM-1214-12	12.0	+0.016 +0.086	14.0	20.0	12.0	1.0
VFM-1618-17	16.0	+0.016 +0.086	18.0	24.0	17.0	1.0
VFM-2023-21	20.0	+0.020 +0.104	23.0	30.0	21.5	1.5

* after pressfit. Testing methods ▶ page 55

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